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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/801,365	03/16/2004	Yow Kwok Heng	145829/11953 (21635-0124)	3161
31450	7590	04/26/2005	EXAMINER	
MCNEES WALLACE & NURICK LLC 100 PINE STREET P.O. BOX 1166 HARRISBURG, PA 17108-1166			FLETCHER III, WILLIAM P	
			ART UNIT	PAPER NUMBER
			1762	

DATE MAILED: 04/26/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/801,365

Applicant(s)

HENG ET AL.

Examiner

William P. Fletcher III

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 16 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 3/16/04.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. **Claims 1-10 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Milaniak et al. (US 5,366,765 A) in view of Rafferty et al. (US 5,334,417 A).**

With respect to claim 1, Milaniak teaches a process for producing an aluminide coating on a hollow article (airfoil). The process comprises furnishing an article (24) having a hollow interior (26, 28, 30) and an access opening to the hollow interior (32, 44); placing an aluminide coating material into the hollow interior through the access opening (2:20-31 and 5:15-6:2); and vapor phase aluminiding the hollow article using an external vapor source separate from the aluminide coating material (6:10-16). Milaniak teaches that the aluminide coating material is in the form of a slurry which contains a source of aluminum, a halide activator, and an inert

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ceramic powder (i.e., filler such as  $\text{Al}_2\text{O}_3$  in Table I) (2:25-28). The material is introduced into the hollow interior and dried before vapor phase aluminiding (2:30-40).

Because Milaniak teaches this coating slurry, the reference fails to teach placing an aluminide coating tape into the hollow interior.

Rafferty teaches an aluminiding tape containing a source of aluminum, a halide activator, a filler (such as  $\text{Al}_2\text{O}_3$ ), and a binder (abstract). The tape is applied and heated to aluminide the underlying substrate (abstract). The tape easily conforms to the surface being coated (airfoil) and is, therefore, well suited to substrates of complex geometry (2:2-4). HF gas is liberated from the binder when the tape is heated and so has the added benefit of cleaning the surface being coated (2:4-6).

It would have been obvious to one of ordinary skill in the art to modify the process of Milaniak so as to utilize as the aluminide coating material, instead of the slurry, the tape of Rafferty. One of ordinary skill in the art would have been motivated to do this for at least three reasons. First, one of ordinary skill in the art would have been motivated by the expectation of similar results; namely, aluminiding the interior of the hollow article. Second, one of ordinary skill in the art would have been motivated by the desire and expectation of simplifying the overall coating process by eliminating the need for the bulky slurry preparation and application apparatus illustrated in Milaniak's Fig. 1. Third, one of ordinary skill in the art would have been motivated by the desire and expectation of additionally and advantageously cleaning the coated surface, as taught by Rafferty. One of ordinary skill in the art would have had a reasonable expectation of successfully making this modification because both Milaniak and Rafferty teach

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aluminiding superalloy substrates with aluminiding compositions containing a source of aluminum, a halide activator, and a filler (such as  $\text{Al}_2\text{O}_3$ ).

With respect to claim 2, both references are silent as to whether or not the hollow article (airfoil) has previously been in service. Rafferty teaches that the aluminide coatings on airfoils frequently become damaged during operation and need to be repaired (1:25-28). It is the examiner's position that the process steps involved in the coating of an aluminide coating on an airfoil are the same regardless of whether that airfoil is new or used. In other words, while the overall process of repairing an airfoil might include certain preliminary cleaning steps, the subsequent process steps followed to apply the aluminide coating are the same as for a new airfoil. Consequently, it is the examiner's position that the process of Milaniak in view of Rafferty is inherently equally capable and suitable for coating both new and used airfoils and, because Rafferty teaches the desirability of repairing damaged, used airfoils, it would have been obvious to one of ordinary skill in the art to utilize the process of Milaniak in view of Rafferty to do so. One of ordinary skill in the art would have been motivated to do so by the desire and expectation of successfully repairing the used airfoil and returning it to service.

With respect to claims 3-6, Milaniak teaches that the hollow article (airfoil) may be nickel-base or cobalt-base superalloys (1:45-54).

With respect to claim 7, with reference to Fig. 2, Milaniak teaches gas turbine blade (24) having the hollow interior (26, 28, 30) extending from a blade tip (42) into a portion of the airfoil section.

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With respect to claim 8, as noted above, Rafferty teaches that the tape containing a source of aluminum and a binder (abstract). Rafferty further teaches that the source of aluminum may be a variety of aluminum-containing alloys (2:50-61).

With respect to claims 9 and 10, Milaniak teaches heating the hollow article (airfoil) to a temperature between 1350°F and 2250°F (2:37-40). This range encompasses those claimed. In the case where a claimed range overlaps or lies inside ranges disclosed by the prior art, a *prima facie* case of obviousness exists. MPEP 2144.05(I). It is the examiner's position that Milaniak's disclosure of heating the hollow article (airfoil) 'in a conventional diffusion aluminide powder pack,' reads on applicant's claimed 'heating...in an atmosphere comprising aluminum vapor.'

With respect to claim 12, this claim incorporates, in independent form, all of the limitations of claims 1, 2, 4, 9, and 10. Therefore, the combination of Milaniak in view of Rafferty is applied here for the same reasons set-forth in connection with these claims above.

With respect to claim 13, as noted in connection with claim 8 above, Rafferty teaches that the tape containing a source of aluminum and a binder (abstract). Rafferty further teaches that the source of aluminum may be a variety of aluminum-containing alloys (2:50-61).

**4. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Milaniak et al. (US 5,366,765 A) in view of Rafferty et al. (US 5,334,417 A), as applied to claim 1 above, and further in view of Baldi (US 3,958,047 A).**

The combined teaching of Milaniak in view of Rafferty is detailed above.

While Milaniak teaches that the hollow article (airfoil) may be heated 'in a conventional diffusion aluminide powder pack so that the outside of the blade is coated at the same time as the inside of the blade' (6:12-15), neither Milaniak nor Rafferty explicitly state that the vapor phase

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aluminiding includes the steps recited in this claim. Nevertheless, it is the examiner's position that these claimed steps describe the very same conventional diffusion aluminide powder pack coating process suggested by Milaniak.

In support of this position, the examiner cites Baldi. With reference to Fig. 1, airfoil (12) is placed in aluminiding container (16), the interior of which is in communication with aluminum alloy aluminiding material (18, 22), and heating to temperatures of between about 1600°F and 2200°F (Examples).

Consequently, it would have been obvious to one of ordinary skill in the art to modify the process of Milaniak in view of Rafferty so as to perform the 'conventional diffusion aluminide powder pack' coating process of Milaniak in the fashion taught by Baldi. One of ordinary skill in the art would have been motivated to do so by the desire and expectation of successfully diffusion aluminiding so that the outside of the blade is coated at the same time as the inside of the blade.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to William P. Fletcher III whose telephone number is (571) 272-1419. The examiner can normally be reached on Monday through Friday, 9 AM to 5 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy H. Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



William Phillip Fletcher III  
Patent Examiner, USPTO  
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4/22/2005